

at 58l. 13s. 4d. per mile per watering season, a figure which contrasts favourably with the cost of tar painting and approximates very closely to that of watering. In some instances the material is applied hot, but Mr. Brown has used it upon all the streets of the Southall-Norwood Urban District in the cold state by means of an ordinary watering cart, with excellent results. The appearance of the road treated with oil-tar is that of a newly-laid wood pavement, and the odour given off is similar. It is his opinion that the use of both coal-tar and oil-tar will become pretty general, the use of oil-tar being adopted where it can be obtained, and coal-tar where oil-tar is not manufactured. The employment of "akonia," calcium chloride, "hal-mite," and "pulvicide" is also considered in the paper. But oil-tar is shown to possess certain advantages, more especially of economy, over other methods.

Mr. W. D. Scott-Moncrieff contributed a paper upon "Some Recent Experiments on the Biolysis of Sewage." The immediate objects of his investigation were to discover what periods of hydrolysis gave a sufficient standard of purification with measured conditions of flow, and the experiments are claimed to have shown, for the first time, not only the behaviour of the sewage in varying circumstances of sojourn, &c., in the septic tank, but also to what extent a well-matured filter working under proper conditions is capable of dealing with the polluting organic matters under widely varying conditions, as regards different periods of hydrolysis. It should be noted, however, that the author points out that the results he has obtained are strictly confined to the special conditions that produced them, and that they do not justify any generalisations.

A noteworthy paper upon "The Limit of School Children's Capacity for Attention" was read by Prof. W. Phillips. After referring to the various experimental inquiries into this question, which have involved the use of various forms of Mosso's ergograph, or fatigue recorder, and Griesbach's æsthesiometer, and many experiments designed to test the rate of deterioration in mental work done at different times of the day and on different days of the week, Prof. Phillips discussed the useful results which all this work has led to. His conclusions are as follows:—

(1) The various tests seem to agree on one point, viz., that during an ordinary school session children can maintain a more even degree of attention, if one or two intervals of rest are included. Where two of ten minutes each can be arranged, more advantage is gained than from one of twenty minutes. (2) The tests seem to agree, too, in showing that a child's attention wanes more rapidly in the afternoon than in the morning. Therefore those teachers who have been accustomed to place the less taxing subjects of instruction in the afternoon seem justified. (3) The various branches of mathematics seem, *ceteris paribus*, to make a greater demand on the attention than most other subjects. This result has long ago been anticipated by those teachers who place mathematics early in the morning session. (4) Gymnastics is not of necessity a mentally recuperative subject, some of the tests proving that children were often tired after a lesson in it. (5) In connection with the discussion of the extent of the fatigue caused by gymnastics, it soon becomes obvious that the results do not depend on the nature of the exercise alone, but also on the teacher. If the latter is a strict disciplinarian, the fatigue may be of a pronounced character. (6) It is clear that attention depends on numerous factors, such as the age, health, and nutrition of the child, the temperature and ventilation of the class-room, &c. But above all it depends on the child's training and education.

RECENT METEOROLOGICAL PUBLICATIONS.

THE report of the second Norwegian Arctic Expedition of 1898-1902,¹ edited by Dr. H. Mohn and published at the expense of the Fridtjof Nansen fund for the advancement of science, forms a valuable addition to the meteorology of a little-known region of the earth's surface.

¹ Report of the Second Norwegian Arctic Expedition in the *Fram*, 1898-1902. No. 4, Meteorology. By H. Mohn. (Kristiania: Published by Videnskabs-Selskabet i Kristiania, 1907.)

The *Fram* left Christiania on June 24, 1898, and sailed, via Godhavn, Upernivik, Foulkefjord, and Cocked Hat, to the first winter quarters, which were reached in September. As the methods of observation were different when the ship was anchored from when she was under way, the results are given separately, and as those obtained at the winter quarters are most complete they are given in part i.

The positions of these winter quarters and the length of stay at each are shown in the following table:—

Place	Lat. N.	Long. W.	Duration of stay.
Rice Strait ...	78° 45' 7"	74° 56' 5"	1898, Sept. 19 to 1899, July 24
Havnefjord ...	76° 29' 4"	84° 3' 7"	1899, Oct. 23 to 1901, Aug. 9
Gaasefjord I. ...	76° 48' 9"	88° 39' 5"	1900, Sept. 18 to 1901, Aug. 12
" II. ...	76° 39' 8"	88° 58' 3"	1901, Sept. 6 to 1902, July 21

The interval August 12 to September 6, 1901, was spent sailing about in the Gaasefjord.

Up to June, 1899, Dr. Johan Svendsen—the physician of the expedition—who had taken part in the examining and comparing of the instruments before they left Norway, was the meteorologist-in-chief, but his lamented death in that month robbed the expedition of his further invaluable services.

The pressure observations were made with the same barometer—a Kew standard Adie 850—throughout, and readings were taken every two hours from midnight to midnight. A small number of records were, from one cause and another, omitted, but the gaps have been filled in by the interpolation of readings from a Richard barograph. In the tables the values, reduced to standard temperature, barometer, gravity, and sea-level, are given for the bi-hourly readings each day; daily and monthly means, and the monthly means for each even hour, are also shown. The mean pressures for the months exhibit a regular annual period, with a chief maximum in March, a secondary maximum in November, a principal minimum in August, and a secondary minimum in January. The range of pressure is 11.8 mm., and the yearly mean pressure for the whole region is 761.40 mm. Other tables summarise the lowest and highest pressures recorded, and the differences between the mean highest and mean lowest pressures in each month are given. The oscillation of pressure is shown to be greatest in February and least in August, greatest in winter, least in summer.

Owing to the rolling of the *Fram* only a few of the thermometers came back safely to Norway, but there is sufficient evidence on which to base the discussion of errors. The reduced values for temperature are tabulated in much the same form as those for pressure, and the summaries show that during the "dark season" (November, December, January), when the sun remains below the horizon, the diurnal variation vanishes entirely. The daily range of temperature shows an annual period with a maximum (3° 47' C.) in April; during the three summer months it is practically stationary at 1° 7' C. to 1° 8' C. The respective effects of clear and overcast skies on the temperatures recorded are shown very clearly (p. 113). With a "clear sky" in the months October to January, the daily minimum occurs in the day hours and the maximum at night, but with an "overcast sky" the ordinary daily period obtains in every month. Dr. Mohn suggests that the investigation of air temperatures in the Arctic and Antarctic regions deserves greater attention, the final results of which would probably throw considerable light on the question of radiation from and to the earth in the lower atmosphere.

The lowest temperature recorded by the expedition (−51° 3' C.) was obtained on January 20, 1901, a year that was marked by unusually low temperatures, and the highest (13° 3' C.) was recorded on July 9, 1902; thus the absolute range becomes 64° 6'. In the mean there are about thirty-four days per annum when the temperature falls below −40°; February is marked by exceptionally high maximum temperatures, especially in 1900.

The other meteorological factors, wind, storms, clouds, precipitation, &c., are dealt with by Dr. Mohn in a similarly comprehensive fashion, but enough has been said to show that in this volume we have data of unique value which should prove of great service in current meteorology. The work has obviously been done with conscientious care and thoroughness; the only pity is that the period for which observations are available is so brief.

Another recent addition to meteorological science appears as a Harvard publication,¹ and deals with the observations made at Arequipa during the years 1892-5. Earlier observations were made at Arequipa during 1888-90, and the results appeared in vol. xxxix. of the *Annals*. The work was resumed in 1891, but as the records thereof are incomplete none earlier than those of 1892 has been included in the present publication.

The area dealt with in this volume differs, of course, in most respects from that treated by Dr. Mohn, the latitude of Arequipa being 16° 22' 28" S., but the same careful observation and full discussion are common to the two volumes. The Arequipa station is a rather peculiar one, inasmuch as it is situated at an altitude of 8040 feet above sea-level, although only 350 feet above the plaza of Arequipa city, some two miles distant. Several peaks some 20,000 feet in height lie within ten to twenty miles of the station, and have been usefully employed in the estimation of the heights and extents of clouds. The results and summaries are given in a series of twenty-four tables, and are too comprehensive in detail and suggestion to be dealt with at length here, but one or two side issues may be noted.

In taking pressure observations, both mercurial barometers and a barograph were employed, and it was noticed that the latter gave a diurnal range consistently smaller than that given by the mercurial barometer; these differences are to be discussed, at length, in a subsequent publication. Barometer readings were taken at 8 a.m., 2 p.m., and 8 p.m.

Similarly, a smaller daily range was indicated by the thermograph than by the thermometer, and the former shows a distinct lag, particularly noticeable at the 8 a.m. readings.

The records of cloudiness were obtained with a sunshine recorder between 6 a.m. and 6 p.m. during the period January, 1892, to June, 1893, but for dates after that the hourly means for sunshine recorder and pole-star recorder are given, thus including the twenty-four hours of each day. The results with the latter instrument agree with eye-observations, but, owing to the sensitiveness of the blue paper employed, the sunshine recorder gives exaggerated values for the clearness of the sky; the character of the cloud was indicated by the numbers 1 to 5, 1 representing thin and 5 representing dense cloud, and it seems probable that only clouds of characters 3 to 5 were registered by this instrument.

W. E. ROLSTON.

THE AMERICAN ASSOCIATION OF MUSEUMS.²

FOLLOWING the example of the museums of the United Kingdom, the officials of similar institutions in the United States have inaugurated a movement which is to be known as "The American Association of Museums." It has been organised with that attention to detail and breadth of view which specially belong to our American cousins, giving full promise of successful development. The pioneer work was carried out by Dr. W. J. Holland, director of the Carnegie Museum, Pittsburgh, Pa., who issued invitations to the heads of a number of the leading museums of America, and others likely to be interested in the formation of such an association, to attend a preliminary meeting to be held at the American Museum of Natural History, Central Park, New York, on May 15, 1906. A cordial response was made to this invitation, more than seventy delegates attending, while nearly fifty others signified by letter their adhesion to the scheme. Practically all phases of museum work were represented from every State in the Union. Dr. Hermon C. Bumpus was elected president, with Dr. George A. Dorsey, Field Museum of Natural History, Chicago, as secretary. Officers were appointed, and a committee of organisation was authorised to draw up a constitution. This is mainly

based on that of the Museums Association established in England nineteen years ago, with one essential difference, for while the English association is primarily one of institutions, the full members being museums, with associate members to include individuals interested in museums, the American association consists of active, associate, sustaining, and honorary members. The active members consist of persons actively engaged in the work of museums, and they alone are eligible to hold office. Sustaining members are museums, with the right to vote through the chief executive officer. Associate members need not be engaged in the work of museums, and they have no vote.

Various papers on practical museum subjects were read at this meeting, but they are not published in this volume, which only gives the general proceedings and titles of the papers submitted. Six life members, 135 active members, and twenty-six sustaining members were enrolled, which shows how heartily the scheme has been accepted, while a strong financial position was at once assured, the subscriptions amounting to 592 dollars, and after deducting the necessary expenses the substantial balance of 472 dollars remained.

By invitation of the trustees of the Carnegie Museum the second annual meeting was held at the Carnegie Institute, Pittsburgh, Pa., on June 4-6, 1907, and the present volume is chiefly occupied with the papers read at that meeting. Dr. Holland gave a concise but amply descriptive account of the purpose of the Carnegie Institute, which shows that in America Mr. Carnegie realises the equal importance of museums with libraries in the scheme of general knowledge and human progression, and does not there restrict his generous impulses to the latter institutions as he does in our country. About sixty members were present at this second conference, when various resolutions affecting the status and future work of the association were discussed, the principal one relating to the form in which the proceedings should be published. There were three suggestions made:—(1) that the papers should be published in one of the American scientific journals; (2) the issue of a separate annual volume; (3) a periodical of their own at more frequent intervals dealing with museum subjects generally. The latter suggestion appeared to find most favour, though there were two important difficulties raised, viz. the cost and the selection of an editor willing to undertake the work. The question of cost showed great divergence of view, from less than 1000 dollars to many thousands. The same difference of opinion prevailed in the English Museums Association when they started their *Museums Journal* seven years ago with only about 100l. in hand, but experience has shown that the increased income from it has more than covered the cost. Speaking from an intimate personal acquaintance with the editorial work of that journal, we would strongly advise no American curator to undertake similar work lightly.

The titles of the papers will show the wide scope of museum work, and how wisely the association has confined itself to the subjects within its legitimate province. We suggest that a table of contents at the beginning of future volumes would greatly facilitate reference and add to the use of the volume. Mr. Henry L. Ward submitted papers on "The Labelling in Museums," "The Aims of Museums," with special reference to his own museum at Milwaukee, and "The Exhibition of Large Groups in Museums." Dr. Benjamin Ives Gilman, of the Museum of Fine Arts, Boston, dealt with "The Triple Aim of Museums of Fine Art" in his customary comprehensive manner. The other papers published include:—"Some Instructive Methods of Bird Installation," by Frank C. Baker; "A New Method of Mounting Ethnographical Objects," by Dr. E. S. Morse; "Installation of Swinging Frames," by W. M. R. French; "Museum Records," by Paul M. Rea; "The Evolution of Museums," by F. A. Lucas; "The Work of a Children's Museum," by Miss Anna B. Gallup, and other contributions on museum administration and management, many of the papers being well illustrated. There is also an interesting plate of the Diplodocus, with the members of the association gathered about it.

E. HOWARTH.

¹ "Harvard College Observatory Annals," vol. xlix., part i. Peruvian Meteorology, by Solon I. Bailey. Observations made at the Arequipa station, 1892-5.

² Proceedings of the American Association of Museums, vol. i. (Pittsburgh, Pa., 1908.)